Dual Axis Analog and PWM Output
Part Number: 0729-1753-99

Operating Specifications

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>Analog 0 to V&lt;sub&gt;dd&lt;/sub&gt; and PWM</td>
</tr>
<tr>
<td>Supply Voltage (V&lt;sub&gt;dd&lt;/sub&gt;)</td>
<td>3.3 V DC to 5 V DC</td>
</tr>
<tr>
<td>Supply Current</td>
<td>15 mA (5 V DC), 10 mA (3.3 V DC)</td>
</tr>
<tr>
<td>Analog Input Resolution</td>
<td>16 bits (10 bits oversampled)</td>
</tr>
<tr>
<td>Operating range</td>
<td>±60°</td>
</tr>
<tr>
<td>Linear Range</td>
<td>±25°</td>
</tr>
<tr>
<td>Axes of Measurement</td>
<td>2</td>
</tr>
<tr>
<td>Repeatability</td>
<td>±0.1°</td>
</tr>
<tr>
<td>Resolution</td>
<td>≤0.003°</td>
</tr>
<tr>
<td>Null Offset</td>
<td>±5°</td>
</tr>
<tr>
<td>Long Term Stability/Drift</td>
<td>≤0.1°</td>
</tr>
<tr>
<td>Null Temperature Coefficient</td>
<td>≤0.006° per °C</td>
</tr>
<tr>
<td>Scale Temperature Coefficient</td>
<td>0.1% per °C</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-40 °C to 85 °C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-40 °C to 125 °C</td>
</tr>
<tr>
<td>Temperature Sensor Range</td>
<td>-40 °C to 125 °C</td>
</tr>
<tr>
<td>Time Constant (63.2% of output)</td>
<td>≤100 ms</td>
</tr>
</tbody>
</table>

Physical Characteristics

- Housing: None (PCBA)
- Electrical Connections: 7 Pin, 2.54 mm (0.1”) spacing
- Weight: 5.5 g
- Length: 31.8 mm (1.25”)
- Width: 31.8 mm (1.25”)
- Height: 16 mm (0.63”)
- Hole Center: 26.7 mm (1.05”)

Analog Output Description

- V<sub>dd</sub> = 3.3 V DC: 0 V DC to 3.3 V DC, 0° tilt = 1.65 V DC
- V<sub>dd</sub> = 5.0 V DC: 0 V DC to 5 V DC, 0° tilt = 2.50 V DC

Note that the analog output is integrated from the PWM output and this circuit will be sensitive to moisture. An enclosure or conformal coating may be necessary in higher humidity environments.

PWM Output Description

- Frequency: 122 Hz
- Duty Cycle: 1% to 99%, 0° tilt = 50% duty cycle
- Resolution: 16 bits

Electrical Connections

<table>
<thead>
<tr>
<th>Pin Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>J1 Pin 1 (+)</td>
<td>+ Supply (r, V&lt;sub&gt;ee&lt;/sub&gt;)</td>
</tr>
<tr>
<td>J1 Pin 2 (C)</td>
<td>- Supply (-, V&lt;sub&gt;ss&lt;/sub&gt;)</td>
</tr>
<tr>
<td>J1 Pin 3 (T)</td>
<td>Temperature analog output (0 to V&lt;sub&gt;dd&lt;/sub&gt;)</td>
</tr>
<tr>
<td>J1 Pin 4 (KA)</td>
<td>X axis analog output (0 to V&lt;sub&gt;dd&lt;/sub&gt;)</td>
</tr>
<tr>
<td>J1 Pin 5 (YA)</td>
<td>Y axis analog output (0 to V&lt;sub&gt;dd&lt;/sub&gt;)</td>
</tr>
<tr>
<td>J1 Pin 6 (XP)</td>
<td>X axis PWM output</td>
</tr>
<tr>
<td>J1 Pin 7 (YP)</td>
<td>Y axis PWM output</td>
</tr>
<tr>
<td>J3</td>
<td>Single axis sensor x axis connection</td>
</tr>
<tr>
<td>J4</td>
<td>Single axis sensor y axis connection</td>
</tr>
<tr>
<td>L1</td>
<td>Dual axis sensor connection</td>
</tr>
</tbody>
</table>

Certifications and Ratings

- RoHS

Description

The 0729-1753-99 dual axis analog/PWM output inclinometer includes the 0717-4318-99 Fredericks TrueTilt™ wide-range, dual-axis electrolytic tilt sensors and 1-6200-007 signal conditioning electronics. This inclinometer has superior tolerances and unit to unit performance with an economic design, making it an excellent solution for a variety of applications in many markets and industries.

Benefits

- Exceptionally high resolution, repeatability, and accuracy
- Very low power consumption
- Extremely long service life with less drift than MEMS tilt sensors
- Superior performance in extreme temperatures/environments
- Excellent customer support
- Designed and manufactured in the United States of America

Applications

- Construction, agricultural, and forestry vehicles and machinery
- Aerial work platforms (AWP), elevating work platforms (EWP)
- Mobile elevating work platforms (MEWPS)
- Scissor lifts (height sensor)
- Telescopic and articulating boom lifts (boom angle sensor)
- Solar tracking

Pin Diagram and Direction of Measurement

Mounting Notes
The 0729-1753-99 and all inclinometers in this series must be mounted horizontally (parallel to the surface of the earth and perpendicular to the force of gravity). For best performance, isolate the unit from vibrations when mounting it.

Related Products

Dual Axis Electrolytic Inclinometers (PCBA)
- 0729-1751-99 ±60˚ range, SPI communications
- 0729-1752-99 ±60˚ range, RS-232 communications
- 0729-1754-99 ±60˚ range, RS-485 communications

Dual Axis Electrolytic Inclinometers (Enclosed, IP67)
- 0729-1755-99 ±60˚ range, analog 0 to 5 V DC output
- 0729-1759-99 ±60˚ range, RS-232 communications
- 0729-1760-99 ±60˚ range, RS-485 communications
- 0729-1760-04 ±10˚ range, RS-485 communications

Dual Axis MEMS Inclinometers (Enclosed, IP67)
- 0750-9002-99 ±90˚ range, RS-485 communications
- 0750-3002-99 ±30˚ range, RS-485 communications
- 0751-9002-99 ±90˚ range, analog 0.5 to 4.5 V DC output
- 0751-3002-99 ±30˚ range, analog 0.5 to 4.5 V DC output

Converting Temperature Values
The board temperature is an analog output from 0 V DC to Vdd V DC. To convert that value to a temperature in °C, use the following equation:

Temperature in °C = ((output voltage/Vdd)-0.5)/0.01

Company Information
Tilt measurement products and sensors that set standards - Fredericks' comprehensive TrueTilt™ tilt sensor product portfolio offers electrolytic tilt sensors, inclinometers, and tilt switches. Patented and engineered to outperform competing technology, our tilt sensors are not just repeatable, but highly accurate with high resolution. Our tilt measurement products have no planned obsolescence and serve industries ranging from construction and RV leveling to aerospace and everything in between.

High performance products designed and manufactured with pride in the USA - For more than 80 years Fredericks has been a global provider and U.S. manufacturer of high-performance tilt measurement products. Built to last, our products are made with state-of-the-art sensing technology, proven processes, and an intrinsic passion for the trade. Offering simple integration and quality and safety benchmarks, our customers benefit not just from standard-setting reliability, but from our commitment to competitive pricing and performance.

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